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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/076,803	02/14/2002	John Scanlan	619P	3372

7590 04/20/2004

Thomas M. Freiburger  
25th Floor  
650 California Street  
San Francisco, CA 94108

EXAMINER

LE, JOHN H

ART UNIT	PAPER NUMBER
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2863

DATE MAILED: 04/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/076,803

Applicant(s)

SCANLAN ET AL.

Examiner

John H Le

Art Unit

2863

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 22 March 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 5-10 is/are rejected.
- 7) ☒ Claim(s) 3 and 4 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |                                                                                                                                                 |                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                                                                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                                            | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>02/05/2004</u> . | 6) <input type="checkbox"/> Other: _____                                                |

***R sponse to Amendm nt***

1. This office action is in response to applicant's amendment received on 03/22/2004.

Claims 1, 4, 9, and 10 have been amended.

The abstract has been amended.

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

3. Claims 1-2 and 5-10 are rejected under 35 U.S.C. 102(e) as being anticipated by Scanlan et al. (USP 6,441,620).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome

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either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Regarding claims 1, 9, and 10, Scanlan et al. teach computer and a method for fault identification, classification fault in a plasma process chamber powered by an RF source (e.g. Fig.4, Abstract), comprising the steps of: a) running a plurality of baseline process of different type (process change respond to changes in input parameters such as pressure, gas flow, power, etc.) on the chamber (e.g. Col.1, lines 63-67, Col.3, lines 14-38), (b) in respect of each baseline process, determining the magnitudes of a plurality of Fourier components of delivered RF power and storing the magnitudes as reference data for that baseline process (e.g. Col.1, line 63-Col.2, line 1), and c) when a fault is to be classified (e.g. Fig.4, step 30), repeating at least one of the said baseline process types according to a predetermined decision tree to classify the fault (e.g. Fig.4, step 30 go back to step 22, Col.2, line 7-11) by comparing the current magnitudes of the said Fourier components with the corresponding reference data (e.g. Col.2, lines 12-14).

Regarding claims 2, Scanlan et al. teach steps (a) and (b) are performed prior to a production run (e.g. Col. 3, lines 3-7, Col.4, lines 12-14, 52-56, Col.5, lines 4-5), wherein the method further comprises monitoring the chamber for faults during the production run (e.g. Col.3, lines 51-52), and wherein step (c) is performed upon detection of a fault during the production run (e.g. Col.4, lines 7-14).

U.S. DEPARTMENT OF COMMERCE

PATENT AND TRADEMARK OFFICE

# EXAMINER'S CASE ACTION WORKSHEET

Application No. 10/076,803		Legal Instrument Examiner
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CHECK TYPE OF ACTION

DATE OF COUNT

<input type="checkbox"/> Non-Final Rejection	<input type="checkbox"/> Restriction/Election Only	<input checked="" type="checkbox"/> Final Rejection
<input type="checkbox"/> Ex Parte Quayle	<input type="checkbox"/> Allowance	<input type="checkbox"/> Advisory Action
<input type="checkbox"/> Examiner's Answer	<input type="checkbox"/> Reply Brief Noted	<input type="checkbox"/> Non-Entry of Reply Brief
<input type="checkbox"/> Defective Notice of Appeal	<input type="checkbox"/> Interference Disposal SPE _____ (Approval for Disposal)	<input type="checkbox"/> Suspension (Examiner-Initiated) SPE _____ (initial)
<input type="checkbox"/> Defective Appeal Brief	<input type="checkbox"/> SIR Disposal (use only after FAOM)	<input type="checkbox"/> Supplemental Examiner's Amendment
<input type="checkbox"/> Miscellaneous Office Letter (With Shortened Statutory Period Set)	<input type="checkbox"/> Notice of Non-Responsive Amendment (With One Month Time Period set)	<input type="checkbox"/> Miscellaneous Office Letter (No Response Period Set)
<input type="checkbox"/> Abandonment after BPAI Decision	<input type="checkbox"/> Supplemental Action (excluding Examiner's Answer)	<input type="checkbox"/> Response to Rule 312 Amendment
<input type="checkbox"/> Letter Restarting Period for Response (e.g., Missing References)	<input type="checkbox"/> Interview Summary	<input type="checkbox"/> Authorization to Change Previous Office Action SPE: _____ (Initial)
<input type="checkbox"/> Abandonment	<input type="checkbox"/> Express Abandonment Date: _____	<input type="checkbox"/> Other Specify: _____

Examiner's Name: John H Le

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Regarding claim 5, Scanlan et al. teach the Fourier components are those of the voltage, current and phase of the delivered RF power (e.g. Col.3, lines 1-7).

Regarding claim 6, Scanlan et al. teach each baseline process is carried out on a test substrate (e.g. Col.4, lines 28-30, lines 42-44).

Regarding claim 7, Scanlan et al. teach each baseline process is carried out on a product wafer (e.g. Col.4, lines 44-45).

Regarding claim 7, Scanlan et al. teach each baseline process is run in the absence of a substrate (e.g. Col.4, lines 43-44).

***Allowable Subject Matter***

4. Claims 3-4 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 3, none of the prior art of record teaches or suggests the combination of a method of fault classification in a plasma process chamber powered by an RF source, wherein the method comprising the steps of:

- a) running a plurality of baseline processes of different types on the chamber;
- (b) in respect of each said baseline process, determining the magnitudes of a plurality of Fourier components of delivered RF power and storing the magnitudes as reference data for that baseline process; and

c) when a fault is to be classified, repeating at least one of the said baseline process types according to a predetermined decision tree to classify the fault by comparing the current magnitudes of the said Fourier components with the corresponding reference data; wherein steps (a) and (b) are performed prior to scheduled downtime of the chamber and step (c) is performed after the scheduled downtime and prior to a production run.

It is these limitations as they are claimed in the combination, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

Regarding claim 4, none of the prior art of record teaches or suggests the combination of a method of fault classification in a plasma process chamber powered by an RF source, wherein the method comprising the steps of:

a) running a plurality of baseline processes of different types on the chamber;

(b) in respect of each baseline process, determining the magnitudes of a plurality of Fourier components of delivered RF power and storing the magnitudes as reference data for that baseline process; and

c) when a fault is to be classified, repeating at least one of the said baseline process types according to a predetermined decision tree to classify the fault by comparing the current magnitudes of the said Fourier components with the corresponding reference data; wherein the baseline processes of different types comprise a first baseline process including the same gases as those used in a production run for which the chamber is used, a second baseline process running an

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inert gas plasma, and a third baseline process running at sufficiently low power that no plasma ignites.

It is these limitations as they are claimed in the combination, which have not been found, taught or suggested in the prior art of record, that make these claims allowable over the prior art.

### ***Response to Arguments***

5. Applicant's arguments filed 03/22/2004 have been fully considered but they are not persuasive.

-Applicant argues that the prior did not teach "running a plurality of baseline processes of different types" and "predetermined decision tree to classify the fault by comparing the current magnitudes of the said Fourier components with the corresponding reference data".

Scanlan et al. disclose the changes in magnitude of a plurality of Fourier components of the RF source resulting from changes in a plurality of the process input parameters from their baseline values. FIG. 2 shows the variation in the plasma current fundamental and 3rd harmonic with process pressure change. These signals are typical, and all 15 Fourier components (voltage, current and phase each at the fundamental and first four harmonics) respond to changes in input parameters such as pressure, gas flow, power, etc., in a similar manner (Col.3, lines 14-38). This feature is seen to be an inherent teaching of that step since the changes in magnitude of a plurality of Fourier components of the RF source resulting from changes in a plurality of the process input parameters from their baseline values such as pressure, gas flow,



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power, etc., in a similar manner that some type of running a plurality of baseline processes of different types must be present in the plasma processing reactor for purpose of providing a method of fault identification in a plasma process powered by an RF source as intended.

Scanlan et al. disclose the magnitude changes are stored as reference data. During a subsequent production run, the plasma process is monitored for faults and if one is found the baseline process is repeated with input parameter values nominally the same as the original baseline values. The changes in the Fourier components from the original baseline values are determined and compared with the reference data to determine which input parameters have changed (Abstract). It is to be understood that the technique is not limited to the measurement of 15 Fourier components as described. Any number can be used, provided that there are a sufficient number of independent components to adequately classify the plurality of process inputs (Col.4, lines 33-37). Although Scanlan et al. do not specifically disclose predetermined decision tree to classify the fault by comparing the current magnitudes of the said Fourier components with the corresponding reference data, this feature is seen to be an inherent teaching of that step since the plurality of process inputs is classified, the changes in the Fourier components from the original baseline values are determined and compared with the reference data that some type of predetermined decision tree to classify the fault by comparing the current magnitudes of the said Fourier components with the corresponding reference data must be present in the plasma processing reactor for

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purpose of providing a method of fault identification in a plasma process powered by an RF source as intended.

### ***Conclusion***

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

### ***Contact Information***

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John H Le whose telephone number is 571-272-2275. The examiner can normally be reached on 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E Barlow can be reached on 571-272-2269. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

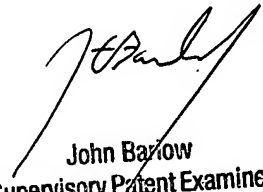
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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

John H. Le

Patent Examiner-Group 2863

April 19, 2004



John Barlow  
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